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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,198	02/09/2004	Kia Silverbrook	MTB17US	8278
24011	7590	07/28/2006	EXAMINER	
SILVERBROOK RESEARCH PTY LTD 393 DARLING STREET BALMAIN, NSW 2041 AUSTRALIA			CHOI, HAN S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/773,198	SILVERBROOK ET AL.	
	Examiner	Art Unit	
	Han S. Choi	2853	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 June 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☒ Claim(s) 4,9,12,15,17,22,28,31,34,36,41,45,48,51 and 53 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>6/8/06</u>  | 6) <input type="checkbox"/> Other: _____                                    |

Continuation of Disposition of Claims: Claims rejected are 1-3,5-8,10,11,13,14,16,18-21,23-27,29,30,32,33,35,37-40,42-44,46,47,49,50,52 and 54.

## **DETAILED ACTION**

### ***Terminal Disclaimer***

1. The terminal disclaimer filed on 6/8/06 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of USSN 10/773199 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1, 19, and 38 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, 5-7, 11, 13, 18, 19, 21, 23-26, 30, 32, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Kubby (US Pat. 5,706,041).

Referring to claims 1, 5, 7, 19, 23, 24, and 26:

- a plurality of nozzles in [Col. 2, Lines 24-26]
- a bubble forming chamber [16] corresponding to each of the nozzles in [Col. 2, Lines 26-30].
- a heater [18] associated with each of the nozzles respectively, the heater [18] having a planar structure with a heater element [20 and 22] connected to electrodes [19] in [Col. 3, Lines 50-67], the heater element [20 and 22] being configured for thermal contact with a bubble forming liquid in [Col. 5, Lines 4-9].
- such that, heating the heater element [20 and 22] above the boiling point of the bubble forming liquid forms a gas bubble that ejects a drop of ejectable liquid from the nozzle (ink bubbles when heated to boiling).
- wherein, the heater element [20 and 22] is suspended parallel to the nozzle in the bubble forming chamber [16] by the electrodes [19] (also cantilevered) in [Col. 3, Lines 53-55] shown in Figs. 1 and 2, such that the gas bubble encircles at least some of the heater element [20 and 22] in [Col. 4, Lines 59-63].

Referring to claims 3 and 21:

- wherein the heater element [20 and 22] is a flat elongated strip shown in Fig. 7.

Referring to claims 6 and 25:

- the printhead being configured to print on a page and to be a page-width printhead in [Col. 1, Lines 13-16].

Referring to claims 11 and 30:

- wherein each heater element [20 and 22] has two opposite sides and is configured such that a said gas bubble formed by that heater element [20 and

22] is formed at both of said sides of that heater element [20 and 22] in [Col. 4, Lines 59-63].

Referring to claims 13 and 32:

- comprising a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure (the method of forming the structure through chemical vapor deposition (CVD) does not limit the structure).

Referring to claims 18 and 37:

- wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless in [Col. 4, Lines 32-50] shown in Fig. 4.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 16, 20, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Chan (US Pat. 5,710,070).

Kubby discloses the basic elements of the claimed invention except for a heater element formed of solid material of which more than 90% of which, by atomic

proportion, is constituted by at least one periodic element having an atomic number below 50 and the heater element predominantly formed by titanium nitride.

Chan teaches a thermal inkjet printhead comprising a resistive layer composed entirely of titanium nitride, which forms a resistor and a contact metal barrier layer in [Col. 2, Lines 10-14]. Titanium has an atomic number less than 50 on the periodic table.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the titanium nitride resistor to the printhead of Kubby for the purpose of having resistors that are more reliable, especially at higher temperatures and less complicated to manufacture in [Col. 2, Lines 1-2].

7. Claims 8 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Silverbrook (US Pat. 5,841,452).

Kubby discloses the basic elements of the claimed invention except for the heater element configured such that an actuation energy of less than 500 nanojoules is required to heat the heater element sufficiently to form a bubble to cause the ejection of a drop.

Silverbrook ('452) teaches that reducing heater energy reduces power dissipation without affecting print speed, and that typically 200 nanojoules is required to eject a drop by heating the heater element in [Col. 18, Lines 15-18].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a heating element heated to a heating energy of

200 nanojoules in the printhead of Kubby for the purpose of maintaining print speed while reducing power dissipation.

8. Claims 10 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Feinn et al. (US Pat. 6,543,879).

Kubby discloses the basic elements of the claimed invention except for a nozzle density greater than 10000 nozzles/cm<sup>2</sup>.

Feinn et al. teaches in [Col. 2, Lines 1-14] a nozzle packing density of at least 100 nozzles/mm<sup>2</sup> or 10000 nozzles/cm<sup>2</sup> when converted to square centimeters.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the printhead of Kubby with a nozzle density above 10000 nozzles/cm<sup>2</sup> for the purpose of accommodating higher printing resolutions and to improve the printhead drop generation rate in [Col. 1, Lines 57-61].

9. Claims 14 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Kashino et al. (US Pat. 5,534,898).

Kubby discloses the basic elements of the claimed invention except for a nozzle plate of the printhead having a thickness of less than 10 microns.

Kashino et al. teaches a thickness of an orifice plate in the order of several microns in [Col. 6, Lines 34-41].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the thickness of the Kashino et al. nozzle



plate to the Kubby printhead for the purpose of obtaining adequate values of the velocity of the discharged ink droplets, amount of ink droplet and refilling frequency, and in consideration of the distance between the thermal energy generating element and the discharge port in [Col. 6, Lines 35-37].

10. Claims 38, 40, 42, 43, 47, 50, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Fukuchi et al. (US Pat. 4,549,191).

Kubby discloses the basic elements of the claimed invention except for supplying the nozzle with a replacement volume of the ejectable liquid equivalent to the ejected drop.

Fukuchi et al. teaches replacing an amount equal in volume to the ink that was ejected from the nozzles in [Col. 1, Lines 35-38].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Fukuchi et al. with the printhead of Kubby for the purpose of preventing ink degeneration in the pressure chamber in [Col. 3, Lines 51-58].

11. Claims 39 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 40, 42, 43, 47, 50, and 54 above, and further in view of Chan (US Pat. 5,710,070).

Kubby in view of Fukuchi et al. discloses the basic elements of the claimed invention except for a heater element formed of solid material of which more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50 and the heater element predominantly formed by titanium nitride.

Chan teaches a thermal inkjet printhead comprising a resistive layer composed entirely of titanium nitride, which forms a resistor and a contact metal barrier layer in [Col. 2, Lines 10-14]. Titanium has an atomic number less than 50 on the periodic table.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the titanium nitride resistor to the printhead of Kubby in view of Fukuchi et al. for the purpose of having resistors that are more reliable, especially at higher temperatures and less complicated to manufacture in [Col. 2, Lines 1-2].

12. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 40, 42, 43, 47, 50, and 54 above, and further in view of Silverbrook (US Pat. 5,841,452).

Kubby in view of Fukuchi et al. discloses the basic elements of the claimed invention except for the heater element configured such that an actuation energy of less

than 500 nanojoules is required to heat the heater element sufficiently to form a bubble to cause the ejection of a drop.

Silverbrook ('452) teaches that reducing heater energy reduces power dissipation without affecting print speed, and that typically 200 nanojoules is required to eject a drop by heating the heater element in [Col. 18, Lines 15-18].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a heating element heated to a heating energy of 200 nanojoules in the printhead of Kubby in view of Fukuchi et al. for the purpose of maintaining print speed while reducing power dissipation.

13. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 40, 42, 43, 47, 50, and 54 above, and further in view of Feinn et al. (US Pat. 6,543,879).

Kubby in view of Fukuchi et al. discloses the basic elements of the claimed invention except for a nozzle density greater than 10000 nozzles/cm<sup>2</sup>.

Feinn et al. teaches in [Col. 2, Lines 1-14] a nozzle packing density of at least 100 nozzles/mm<sup>2</sup> or 10000 nozzles/cm<sup>2</sup> when converted to square centimeters.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the printhead of Kubby in view of Fukuchi et al. with a nozzle density above 10000 nozzles/cm<sup>2</sup> for the purpose of accommodating

higher printing resolutions and to improve the printhead drop generation rate in [Col. 1, Lines 57-61].

14. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US Pat. 5,706,041) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 40, 42, 43, 47, 50, and 54 above, and further in view of Kashino et al. (US Pat. 5,534,898).

Kubby in view of Fukuchi et al. disclose the basic elements of the claimed invention except for a nozzle plate of the printhead having a thickness of less than 10 microns.

Kashino et al. teaches a thickness of an orifice plate in the order of several microns in [Col. 6, Lines 34-41].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the thickness of the Kashino et al. nozzle plate to the Kubby in view of Fukuchi et al. printhead for the purpose of obtaining adequate values of the velocity of the discharged ink droplets, amount of ink droplet and refilling frequency, and in consideration of the distance between the thermal energy generating element and the discharge port in [Col. 6, Lines 35-37].

#### ***Allowable Subject Matter***

15. Claims 4, 9, 12, 15, 17, 22, 28, 31, 34, 36, 41, 45, 48, 51, and 53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Han S. Choi whose telephone number is (571) 272-8350. The examiner can normally be reached on Monday - Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HSC  
7/19/06



**STEPHEN MEIER**  
**SUPERVISORY PATENT EXAMINER**